

## Model Structure Comparison

This document compares the re-estimated Barra European Equity Model (EUE3) to its predecessor, EUE2. We compare model structure, asset coverage, factors and descriptors for style factors for both models.

EUE3 Model Summary			
	Base Model	UK Derived Model	Eastern Europe Derived Model
Asset Coverage	~9500	~9500	~9500
Estimation Universe	~2400	~2400	~2400
Style Factors	9	9	9
Industry Factors	29	58	58
Country Factors	29	29	29
Currency Factors*	34**	34**	34**
Market Factors	1	2	2

EUE2 Model Summary	
Asset Coverage	~8000
Estimation Universe	~1900
Style Factors	9
Industry Factors	58
Country Factors	16
Currency Factors*	17
Market Factors	-

\* Includes Euro legacy currencies (FRF, ESP, ITL, etc)

\*\* Includes DEM and EUR, which are not, strictly speaking, model factors, but represent the pre- and post-Euro base currencies for the model, respectively. Also includes AUD, CAD, and JPY, which are covered in Models Direct only.

### EUE3 Daily Risk Updates

EUE3 introduces a daily risk model update. The Covariance Matrix, Specific Risk and Fundamental Betas will now be updated on a daily basis.

### EUE3 Specific Risk Model

EUE3 introduces a new specific risk model. This new specific risk model primarily uses time series estimation. The main advantage of a time series-based specific risk model is its idiosyncratic character; risk is estimated individually for every stock. The challenge of time series estimation is that not all stocks in a broad universe lend themselves to this modeling approach (for example, recent IPOs and illiquid stocks). In these cases, EUE3 uses a combined time series and structural model approach.

## Style Factors

EUE3 Style Factors	
Momentum	<ul style="list-style-type: none"> <li>Historical weekly alpha</li> <li>12-month relative strength, lagged by 1 month</li> <li>6-month relative strength, lagged by 1 month</li> </ul>
Volatility	<ul style="list-style-type: none"> <li>Historical weekly beta</li> <li>Cumulative range</li> <li>Daily asset volatility</li> </ul>
Value	<ul style="list-style-type: none"> <li>Book-to-price</li> <li>Sales-to-price</li> </ul>
Growth	<ul style="list-style-type: none"> <li>Trailing growth of total assets</li> <li>Trailing growth of annual sales</li> <li>Trailing growth of annual net earnings</li> <li>Short-term predicted earnings growth</li> <li>Long-term (3-5 years) predicted earnings growth</li> </ul>
Leverage	<ul style="list-style-type: none"> <li>Book leverage</li> <li>Market leverage</li> </ul>
Size	<ul style="list-style-type: none"> <li>Log of market capitalization</li> <li>Log of total assets</li> </ul>
Dividend Yield	<ul style="list-style-type: none"> <li>Dividend yield</li> </ul>
Earnings Yield	<ul style="list-style-type: none"> <li>Trailing earnings-to-price ratio</li> <li>Cash earnings-to-price ratio</li> <li>Return on equity</li> <li>Predicted earnings-to-price ratio</li> </ul>
Liquidity	<ul style="list-style-type: none"> <li>Log of annual share turnover</li> <li>Log of quarterly share turnover</li> <li>Log of monthly share turnover</li> </ul>

EUE2 Style Factors	
Momentum	<ul style="list-style-type: none"> <li>Logarithm rate of excess return over the last 12 months</li> <li>Historical alpha</li> </ul>
Volatility	<ul style="list-style-type: none"> <li>Historical sigma</li> <li>Cumulative range</li> <li>Previous month's squared return</li> <li>Squared return from 2 months ago</li> <li>Squared return from 3 months ago</li> </ul>
Value	<ul style="list-style-type: none"> <li>Book to price</li> <li>Earnings to price</li> <li>Sales to price</li> </ul>
Growth	<ul style="list-style-type: none"> <li>Earnings growth</li> <li>Asset growth</li> <li>Sales growth</li> <li>Dividend growth</li> </ul>
Leverage	<ul style="list-style-type: none"> <li>Debt to assets</li> <li>Debt to price</li> </ul>
Size	<ul style="list-style-type: none"> <li>Log of market capitalization</li> <li>Total assets</li> </ul>
Yield	<ul style="list-style-type: none"> <li>Dividend yield</li> </ul>
Market Sensitivity	<ul style="list-style-type: none"> <li>Historical beta</li> <li>Historical beta times historical sigma</li> </ul>
Foreign Exposure	<ul style="list-style-type: none"> <li>Foreign earnings</li> <li>Foreign sales</li> <li>Foreign assets</li> </ul>

## Industry Factors

The EUE2 Industry Factors are split into UK and Continental Europe.

The EUE3 base model has a single set of Industry Factors. For the EUE3 derived models, the factors listed below are duplicated and split into:

- UK and Continental Europe (ex-UK) – UK derived model
- Eastern Europe (EE) and Western Europe (WE) – Eastern Europe derived model.

## EUE3 vs. EUE2 – Model Structure Comparison

| July 2009

The base model has 29 Industry Factors and the derived models have 58 Industry Factors. For example, Factor 1 in the table below is Energy Equipment & Services. It is split into:

- UK Derived Model: (UK) Energy Equipment & Services and (Ex-UK) Energy Equipment & Services
- EE Derived Model: (EE) Energy Equipment & Services and (WE) Energy Equipment & Services

EUE3 Industry Factors	EUE2 Industry Factors
1. Energy Equipment & Services	1. Chemicals
2. Oil Gas & Consumable Fuels	2. Basic Resources
3. Other Materials	3. Automobiles
4. Metals & Mining	4. Entertainment
5. Other Capital Goods	5. Travel
6. Construction & Engineering	6. Textiles
7. Machinery	7. Retail
8. Commercial Services	8. Media
9. Other Transport	9. Energy
10. Airlines	10. Banks
11. Autos & Components	11. Insurance
12. Consumer Durables & Apparel	12. Financial Services
13. Consumer Services	13. Real Estate
14. Media	14. Investment Trusts
15. Retailing	15. Healthcare
16. Food & Staples Retailing	16. Construction
17. Food Beverages & Tobacco	17. Industrial Equipment
18. Household & Personal Products	18. Industrial Services
19. Healthcare Equipment & Services	19. Industrial Diversified
20. Pharmaceuticals	20. Transportation
21. Banks	21. Aerospace & Defense
22. Diversified Financials	22. Food
23. Insurance	23. Distillers & Brewers
24. Real Estate	24. Tobacco
25. Software & Services	25. Non-Cyclical Goods
26. Technology Hardware & Equipment	26. Technology Hardware
27. Semiconductors	27. Technology Software
28. Telecommunication Services	28. Telecommunications
29. Utilities	29. Utilities

## Country Factors

EUE3 Country Factors	
1. Austria	16. Latvia
2. Belgium	17. Lithuania
3. Croatia	18. Netherlands
4. Cyprus	19. Norway
5. Czech Republic	20. Poland
6. Denmark	21. Portugal
7. Estonia	22. Romania
8. Finland	23. Russia
9. France	24. Slovenia
10. Germany	25. Spain
11. Greece	26. Sweden
12. Hungary	27. Switzerland
13. Iceland	28. Turkey
14. Ireland	29. United Kingdom
15. Italy	

EUE2 Country Factors	
1. Austria	
2. Belgium	
3. Denmark	
4. Finland	
5. France	
6. Germany	
7. Greece	
8. Ireland	
9. Italy	
10. Netherlands	
11. Norway	
12. Portugal	
13. Spain	
14. Sweden	
15. Switzerland	
16. United Kingdom	

## Currency Factors

EUE3 Currency Factors	
1. Austria	18. Lithuania
2. Belgium	19. Netherlands
3. Croatia	20. Norway
4. Cyprus	21. Poland
5. Czech	22. Portugal
6. Denmark	23. Romania
7. Estonia	24. Russia
8. Euro**	25. Slovenia
9. Finland	26. Spain
10. France	27. Sweden
11. Germany**	28. Switzerland
12. Greece	29. Turkey
13. Hungary	30. United Kingdom
14. Iceland	31. United States
15. Ireland	32. Australia*
16. Italy	33. Canada*
17. Latvia	34. Japan*

EUE2 Currency Factors	
1. Austria	
2. Belgium	
3. Denmark	
4. Finland	
5. France	
6. Germany**	
7. Greece	
8. Ireland	
9. Italy	
10. Netherlands	
11. Norway	
12. Portugal	
13. Spain	
14. Sweden	
15. Switzerland	
16. United Kingdom	
17. United States	
18. Euro**	

\* Available in Models Direct only

\*\* DEM and EUR are not, strictly speaking, model factors, but represent the pre- and post-Euro base currencies for the model, respectively. Also includes AUD, CAD, and JPY, which are covered in Models Direct only.

## Contact Information

[clientservice@mscibarra.com](mailto:clientservice@mscibarra.com)

### Americas

Americas	1.888.588.4567 (toll free)
Atlanta	+ 1.404.551.3212
Boston	+ 1.617.532.0920
Chicago	+ 1.312.675.0545
Montreal	+ 1.514.847.7506
New York	+ 1.212.804.3901
San Francisco	+ 1.415.576.2323
Sao Paulo	+ 55.11.3706.1360
Stamford	+1.203.325.5630
Toronto	+ 1.416.628.1007

### Europe, Middle East & Africa

Amsterdam	+ 31.20.462.1382
Cape Town	+ 27.21.673.0100
Frankfurt	+ 49.69.133.859.00
Geneva	+ 41.22.817.9777
London	+ 44.20.7618.2222
Madrid	+ 34.91.700.7275
Milan	+ 39.02.5849.0415
Paris	0800.91.59.17 (toll free)
Zurich	+ 41.44.220.9300

### Asia Pacific

China Netcom	10800.852.1032 (toll free)
China Telecom	10800.152.1032 (toll free)
Hong Kong	+ 852.2844.9333
Singapore	+ 65.6834.6777
Sydney	+ 61.2.9033.9333
Tokyo	+ 81.3.5226.8222

[www.mscibarra.com](http://www.mscibarra.com)

## Notice and Disclaimer

- This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. ("MSCI"), Barra, Inc. ("Barra"), or their affiliates (including without limitation Financial Engineering Associates, Inc.) (alone or with one or more of them, "MSCI Barra"), or their direct or indirect suppliers or any third party involved in the making or compiling of the Information (collectively, the "MSCI Barra Parties"), as applicable, and is provided for informational purposes only. The Information may not be reproduced or disseminated in whole or in part without prior written permission from MSCI or Barra, as applicable.
- The Information may not be used to verify or correct other data, to create indices, risk models or analytics, or in connection with issuing, offering, sponsoring, managing or marketing any securities, portfolios, financial products or other investment vehicles based on, linked to, tracking or otherwise derived from any MSCI or Barra product or data.
- Historical data and analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction.
- None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), or a promotion or recommendation of, any security, financial product or other investment vehicle or any trading strategy, and none of the MSCI Barra Parties endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies. None of the Information, MSCI Barra indices, models or other products or services is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such.
- The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information.
- NONE OF THE MSCI BARRA PARTIES MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY LAW, MSCI AND BARRA, EACH ON THEIR BEHALF AND ON THE BEHALF OF EACH MSCI BARRA PARTY, HEREBY EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.
- Without limiting any of the foregoing and to the maximum extent permitted by law, in no event shall any of the MSCI Barra Parties have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or wilful default of itself, its servants, agents or sub-contractors.
- Any use of or access to products, services or information of MSCI or Barra or their subsidiaries requires a license from MSCI or Barra, or their subsidiaries, as applicable. MSCI, Barra, MSCI Barra, EAFE, Aegis, Cosmos, BarraOne, and all other MSCI and Barra product names are the trademarks, registered trademarks, or service marks of MSCI, Barra or their affiliates, in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and Standard & Poor's.

© 2009 MSCI Barra. All rights reserved.

### About MSCI Barra

MSCI Barra is a leading provider of investment decision support tools to investment institutions worldwide. MSCI Barra products include indices and portfolio risk and performance analytics for use in managing equity, fixed income and multi-asset class portfolios.

The company's flagship products are the MSCI International Equity Indices, which include over 120,000 indices calculated daily across more than 70 countries, and the Barra risk models and portfolio analytics, which cover 56 equity and 46 fixed income markets. MSCI Barra is headquartered in New York, with research and commercial offices around the world.